

3/11/02



Silkworm 12000

Version 4.0

Zoning with Bloom

Self Paced Training

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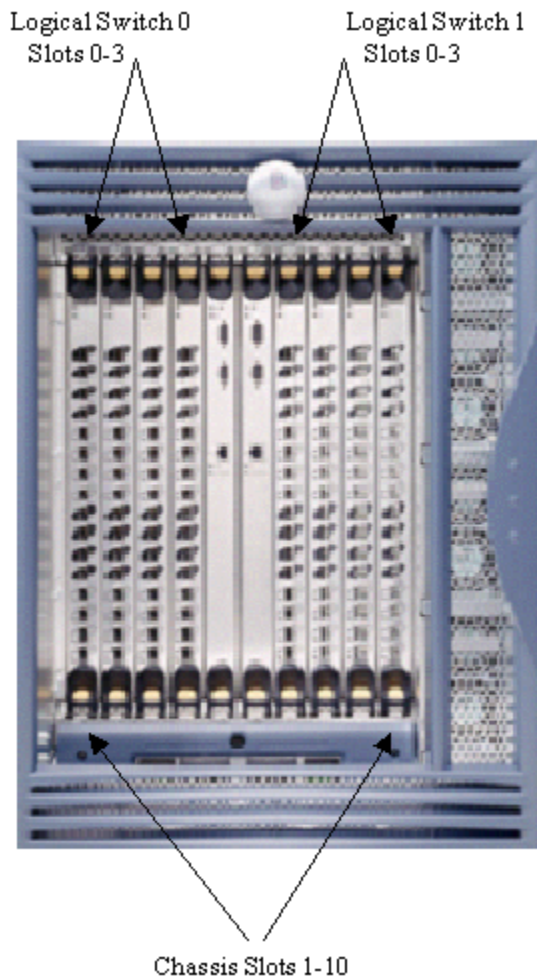
Overview

Advanced Zoning software limits access to data by segmenting a fabric into virtual private SANs. On 1 Gb/sec and 2 Gb/sec switches, software-enforced zoning prevents hosts from discovering unauthorized target devices. Hardware-enforced zoning prevents a host from accessing a device that is authorized. This provides the most secure zoning available. In addition, Advanced Zoning on 2 Gb/sec switches enables hardware enforcement for devices identified by World Wide Name (WWN), which is new functionality that was not available in the SilkWorm 2000 series switches, which could only do soft WWN zoning. With WWN zoning, zone enforcement is adjusted automatically, even if a device moves to another port. This new zoning model allows for the continued flexibility that traditional software-enhanced zoning provides plus garners the security benefits of legacy hardware-enforced zoning.

SW12000 Chassis slots and Logical Switch Slot Designations

The SW12000 chassis slots are numbered from 1-10. Chassis slots 1-4 comprise Logical Switch 0, and chassis slots 7-10 comprise Logical Switch 1. Chassis slots 5 and 6 are the Control Processors (CP0/CP1).

When speaking in Logical Switches terminology, the slot numbering is Slot 0 – 3.



SW12000 “Port” to “Area” Mapping

The SW12000 16-port boards are labeled with port numbers (physical port numbers). These boards can be moved from slot to slot. In doing so, the "logical port numbers" change, hence the introduction of the “area” number. This use of the ‘area’ number is essential when zoning by “port”.

A mapping of port to area follows:

SW0 slot 0	- Area numbers range from 0 to 15 - Port numbers range from 0 to 15
SW0 slot 1	- Area numbers range from 16 to 31 - Port numbers range from 0 to 15
SW0 slot 2	- Area numbers range from 32 to 47 - Port numbers range from 0 to 15
SW0 slot 3	- Area numbers range from 48 to 63 - Port numbers range from 0 to 15
SW1 slot 0	- Area numbers range from 0 to 15 - Port numbers range from 0 to 15
SW1 slot 1	- Area numbers range from 16 to 31 - Port numbers range from 0 to 15
SW1 slot 2	- Area numbers range from 32 to 47 - Port numbers range from 0 to 15
SW1 slot 3	- Area numbers range from 48 to 63 - Port numbers range from 0 to 15

Mapping ‘port’ numbers to ‘area’ numbers formula

For chassis slots 1 to 4:

Area or logical port number = physical port number + (chassis slot number – 1) * 16

For chassis slots 7 to 10:

Area or logical port number = physical port number + (chassis slot number – 7) * 16

Also, the `switchShow` command output can be used to determine the corresponding area.

Zoning Enforcement

Zones can be comprised of:

- | | |
|-----------------|---------------------------|
| - DomainID/port | (port designated) |
| - WWN | (Node WWN or Port WWN) |
| - Mixed | (port and WWN designated) |
| - Broadcast | |

There are three types of zones enforcements:

- HARD PORT – If all of the members of a zone are defined by <Domain, Port> (Referred to as zoning by Port). Port zoning with the SW12000 utilized the “Area numbers” in place of the port number
- HARD WWN – If all of the members of a zone are defined by their WWN names. The WWN can be either the Port_WWN or the Node_WWN.
- SOFT – If some members of a zone are defined by their WWN names while remaining are defined by Port. This type reverts soft enforcement, also known as Name Server enforced.

What is Soft Enforcement?

Under soft zoning enforcement, the NameServer restricts the visibility to other devices in the Fabric. When a device comes on line and queries the NameServer for devices, the NameServer will only inform it of other devices that it is zoned with. If the device misbehaves, and is aware of other devices that are not in its zone, it will be able to access those devices.

What is Hard Enforcement?

Under hard enforcement, the ASIC hardware controls what ports can access. Zoning by Port's only or WWN's only are hardware enforceable under FOS 3.x and 4.x. Broadcast zones are also hardware enforced.

When implementing Zoning under the Loom ASIC (FOS 2.x) , if any zone in the ‘effective’ configuration (cfg1) contains mixed port and WWN elements, then every zone in the ‘effective’ configuration (cfg1) will be soft enforced.

Zoning under Bloom (FOS 3.x and 4.x), zoning enforcement occurs at the granularity of each zone, not the configuration. Only zones that have mixed port and WWN entries will be soft enforced, not the entire ‘effective’ configuration (cfg1).

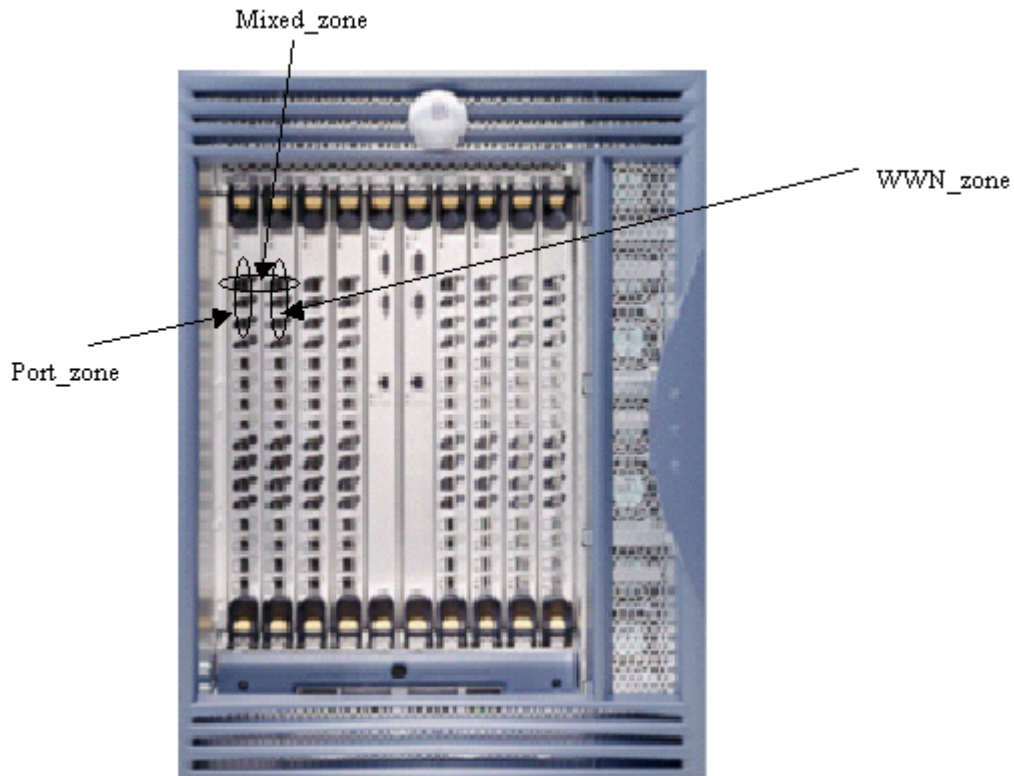
How to determine zone enforcement type for a given port?

Run the “portZoneShow” command.

Run the “filterPortShow --slot <slot> <port>” command.

Lab Exercise

Using as few as four devices, set up the following configuration.



- Validate that the devices are functioning correctly from the switch perspective using `switchshow` and `nsshow`.

```
UlyssesSW0:admin> switchshow
switchName:    UlyssesSW0
switchType:    10.1
switchState:    Online
switchRole:    Principal
switchDomain:    1
switchId:    fffc01
switchWwn:    10:00:00:60:69:80:04:b2
switchBeacon:    OFF
blade1: Beacon: OFF
blade2: Beacon: OFF
```

```
Area Slot Port Gbic Speed State
=====
0      1      0  --    N2    No_Module
1      1      1  --    N2    No_Module
2      1      2  --    N2    No_Module
3      1      3  --    N2    No_Module
4      1      4  --    N2    No_Module
5      1      5  --    N2    No_Module
6      1      6  id    N2    No_Light
7      1      7  --    N2    No_Module
8      1      8  id    N2    No_Light
9      1      9  --    N2    No_Module
```

```

10    1    10    --    N2    No_Module
11    1    11    --    N2    No_Module
12    1    12    --    N2    No_Module
13    1    13    id    N2    Online    F-Port    20:00:00:01:73:00:35:67
14    1    14    id    N1    Online    L-Port    1 private, 5 phantom
15    1    15    id    N1    Online    F-Port    21:00:00:e0:8b:04:a6:3b
16    2    0     --    N2    No_Module
17    2    1     --    N2    No_Module
18    2    2     --    N2    No_Module
19    2    3     --    N2    No_Module
20    2    4     --    N2    No_Module
21    2    5     --    N2    No_Module
22    2    6    id    N2    No_Light
23    2    7     --    N2    No_Module
24    2    8     --    N2    No_Module
25    2    9     --    N2    No_Module
26    2    10    --    N2    No_Module
27    2    11    --    N2    No_Module
28    2    12    --    N2    No_Module
29    2    13    id    N2    Online    F-Port    21:00:00:e0:8b:04:03:76
30    2    14    id    N1    Online    F-Port    21:00:00:e0:8b:01:98:62
31    2    15    id    N1    Online    L-Port    2 public

```

UlyssesSW0:admin> **nsshow**

The Local Name Server has 7 entries {

```

Type Pid    COS      PortName                      NodeName                      TTL(sec)
N      010d00;    2,3;20:00:00:01:73:00:35:67;10:00:00:01:73:00:35:67; na
FC4s: FCIP FCP
Fabric Port Name: 20:0d:00:60:69:80:04:b2

NL     010e01;    3;50:05:08:b1:00:04:d4:20;50:05:08:b1:00:04:d4:20; na
FC4s: FCP
Fabric Port Name: 20:0e:00:60:69:80:04:b2

N      010f00;    3;21:00:00:e0:8b:04:a6:3b;20:00:00:e0:8b:04:a6:3b; na
FC4s: FCP
Fabric Port Name: 20:0f:00:60:69:80:04:b2

N      011d00;    3;21:00:00:e0:8b:04:03:76;20:00:00:e0:8b:04:03:76; na
FC4s: FCP
Fabric Port Name: 20:1d:00:60:69:80:04:b2

N      011e00;    3;21:00:00:e0:8b:01:98:62;20:00:00:e0:8b:01:98:62; na
FC4s: FCP
Fabric Port Name: 20:1e:00:60:69:80:04:b2

NL     011fe8;    3;22:00:00:20:37:d8:d6:e5;20:00:00:20:37:d8:d6:e5; na
FC4s: FCP [SEAGATE ST318304FC 0005]
Fabric Port Name: 20:1f:00:60:69:80:04:b2

NL     011fef;    3;22:00:00:20:37:d8:d6:8f;20:00:00:20:37:d8:d6:8f; na
FC4s: FCP [SEAGATE ST318304FC 0005]
Fabric Port Name: 20:1f:00:60:69:80:04:b2
}

```

- Add zoning configuration, similar to the following, based on your set of devices.

UlyssesSW0:admin> **cfgshow**

Defined configuration:
no configuration defined

Effective configuration:
no configuration in effect

UlyssesSW0:admin> **zonecreate "port_zone", "1,13; 1,14; 1,15"**

UlyssesSW0:admin> **zonecreate "wnw_zone", "20:00:00:e0:8b:04:03:76"**

```
UlyssesSW0:admin> zoneadd "wnn_zone", "20:00:00:e0:8b:01:98:62; 20:00:00:20:37:d8:d6:e5;  
20:00:00:20:37:d8:d6:8f"
```

```
UlyssesSW0:admin> cfgcreate "cfg1", "port_zone; wnn_zone"
```

```
UlyssesSW0:admin> cfgshow
```

```
Defined configuration:
```

```
cfg:  cfg1      port_zone; wnn_zone  
zone: port_zone  
      1,13; 1,14; 1,15  
zone: wnn_zone  
      20:00:00:e0:8b:04:03:76; 20:00:00:e0:8b:01:98:62;  
      20:00:00:20:37:d8:d6:e5; 20:00:00:20:37:d8:d6:8f
```

```
Effective configuration:  
no configuration in effect
```

- Note that the portzoneshow command only displays information about the 'effective' configuration.

```
UlyssesSW0:admin> portzoneshow
```

```
No Port-level zoning information available.
```

- Enable the configuration.

```
UlyssesSW0:admin> cfgenable "cfg1"
```

```
zone config "cfg1" is in effect
```

```
Updating flash ...
```

```
UlyssesSW0:admin> cfgshow
```

```
Defined configuration:
```

```
cfg:  cfg1      port_zone; wnn_zone  
zone: port_zone  
      1,13; 1,14; 1,15  
zone: wnn_zone  
      20:00:00:e0:8b:04:03:76; 20:00:00:e0:8b:01:98:62;  
      20:00:00:20:37:d8:d6:e5; 20:00:00:20:37:d8:d6:8f
```

```
Effective configuration:
```

```
cfg:  cfg1  
zone: port_zone  
      1,13  
      1,14  
      1,15  
zone: wnn_zone  
      20:00:00:e0:8b:04:03:76  
      20:00:00:e0:8b:01:98:62  
      20:00:00:20:37:d8:d6:e5  
      20:00:00:20:37:d8:d6:8f
```

- Use the portzoneshow command to display information about how a port will be enforced.

```
UlyssesSW0:admin> portzoneshow
```

```
PORT: 0   Not Zoned  
PORT: 1   Not Zoned  
PORT: 2   Not Zoned  
PORT: 3   Not Zoned  
PORT: 4   Not Zoned  
PORT: 5   Not Zoned  
PORT: 6   Not Zoned  
PORT: 7   Not Zoned  
PORT: 8   Not Zoned  
PORT: 9   Not Zoned  
PORT: 10  Not Zoned
```

```

PORT: 11    Not Zoned
PORT: 12    Not Zoned
PORT: 13    Enforcement: HARD PORT          defaultSoft: 0  defaultHard: 0

PORT: 14    Enforcement: HARD PORT          defaultSoft: 0  defaultHard: 0

PORT: 15    Enforcement: HARD PORT          defaultSoft: 0  defaultHard: 0

PORT: 16    Not Zoned
PORT: 17    Not Zoned
PORT: 18    Not Zoned
PORT: 19    Not Zoned
PORT: 20    Not Zoned
PORT: 21    Not Zoned
PORT: 22    Not Zoned
PORT: 23    Not Zoned
PORT: 24    Not Zoned
PORT: 25    Not Zoned
PORT: 26    Not Zoned
PORT: 27    Not Zoned
PORT: 28    Not Zoned
PORT: 29    Enforcement: HARD WWN          defaultSoft: 0  defaultHard: 0

PORT: 30    Enforcement: HARD WWN          defaultSoft: 0  defaultHard: 0

PORT: 31    Enforcement: HARD WWN          defaultSoft: 0  defaultHard: 0

```

- Add a new zone to the configuration that overlaps that existing zones.

```
UlyssesSW0:admin> zonecreate "mixed_zone", "1,15; 20:00:00:20:37:d8:d6:e5"
```

```
UlyssesSW0:admin> cfgadd "cfg1", "mixed_zone"
```

```
UlyssesSW0:admin> cfgenable "cfg1"
```

```
zone config "cfg1" is in effect
```

```
Updating flash ...
```

```
UlyssesSW0:admin> cfgshow
```

```
Defined configuration:
```

```

cfg:  cfg1    port_zone; wwn_zone; mixed_zone
zone: mixed_zone
      1,15; 20:00:00:20:37:d8:d6:e5
zone: port_zone
      1,13; 1,14; 1,15
zone: wwn_zone
      20:00:00:e0:8b:04:03:76; 20:00:00:e0:8b:01:98:62;
      20:00:00:20:37:d8:d6:e5; 20:00:00:20:37:d8:d6:8f

```

```
Effective configuration:
```

```

cfg:  cfg1
zone: mixed_zone
      1,15
      20:00:00:20:37:d8:d6:e5
zone: port_zone
      1,13
      1,14
      1,15
zone: wwn_zone
      20:00:00:e0:8b:04:03:76
      20:00:00:e0:8b:01:98:62
      20:00:00:20:37:d8:d6:e5
      20:00:00:20:37:d8:d6:8f

```

- Use portzoneshow command to observe the enforcement of a mixed environment.

```
UlyssesSW0:admin> portzoneshow
```

```

PORT: 0    Not Zoned
PORT: 1    Not Zoned
PORT: 2    Not Zoned

```



```
PORT: 3    Not Zoned
PORT: 4    Not Zoned
PORT: 5    Not Zoned
PORT: 6    Not Zoned
PORT: 7    Not Zoned
PORT: 8    Not Zoned
PORT: 9    Not Zoned
PORT: 10   Not Zoned
PORT: 11   Not Zoned
PORT: 12   Not Zoned
PORT: 13   Enforcement: HARD PORT      defaultSoft: 0  defaultHard: 0

PORT: 14   Enforcement: HARD PORT      defaultSoft: 0  defaultHard: 0

PORT: 15   Enforcement: SOFT          defaultSoft: 0  defaultHard: 0
PORT: 16   Not Zoned
PORT: 17   Not Zoned
PORT: 18   Not Zoned
PORT: 19   Not Zoned
PORT: 20   Not Zoned
PORT: 21   Not Zoned
PORT: 22   Not Zoned
PORT: 23   Not Zoned
PORT: 24   Not Zoned
PORT: 25   Not Zoned
PORT: 26   Not Zoned
PORT: 27   Not Zoned
PORT: 28   Not Zoned
PORT: 29   Enforcement: HARD WWN      defaultSoft: 0  defaultHard: 0

PORT: 30   Enforcement: HARD WWN      defaultSoft: 0  defaultHard: 0

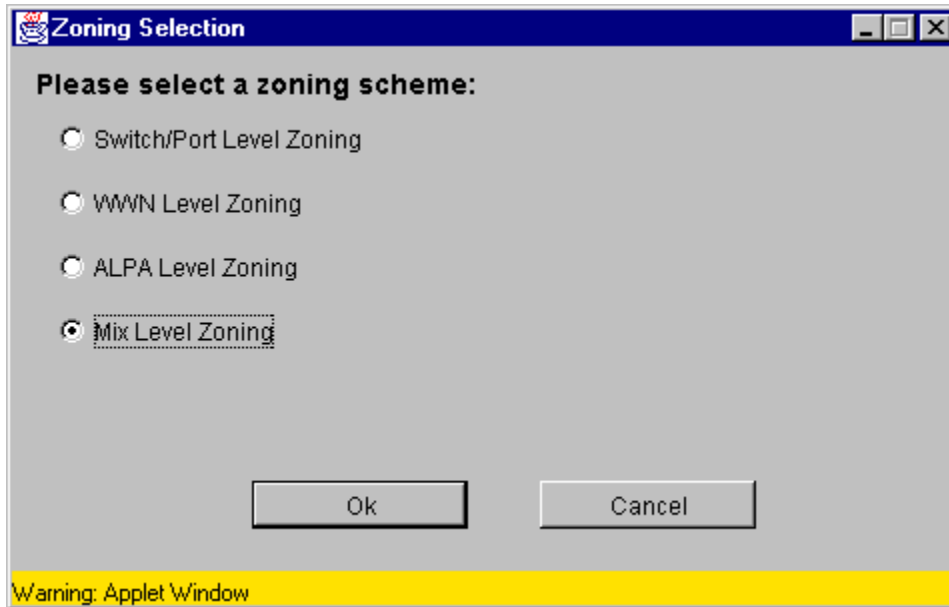
PORT: 31   Enforcement: SOFT          defaultSoft: 0  defaultHard: 0
```

- Notice that the non-overlapping objects from 'port_zone' and 'wwn_zone' are still hard enforced. The ports in the 'mixed_zone' will be Name Server enforced.

Zoning with WEB TOOLS Highlights

Brocade recommends that when zoning a Fabric that contains a SilkWorm 12000 through Web Tools that it is done while being logged into the SilkWorm 12000.

When entering Zoning from WEB TOOS, you are prompted for the type of Zoning that you will be generating. For our example, select the Mix Level .



The following are the definitions of the zoning schemes as above.

Switch/Port Level Zoning: All zone definitions must be on ports. Aliases, zones, and configuration files that have objects other than ports cannot be selected or operated on.

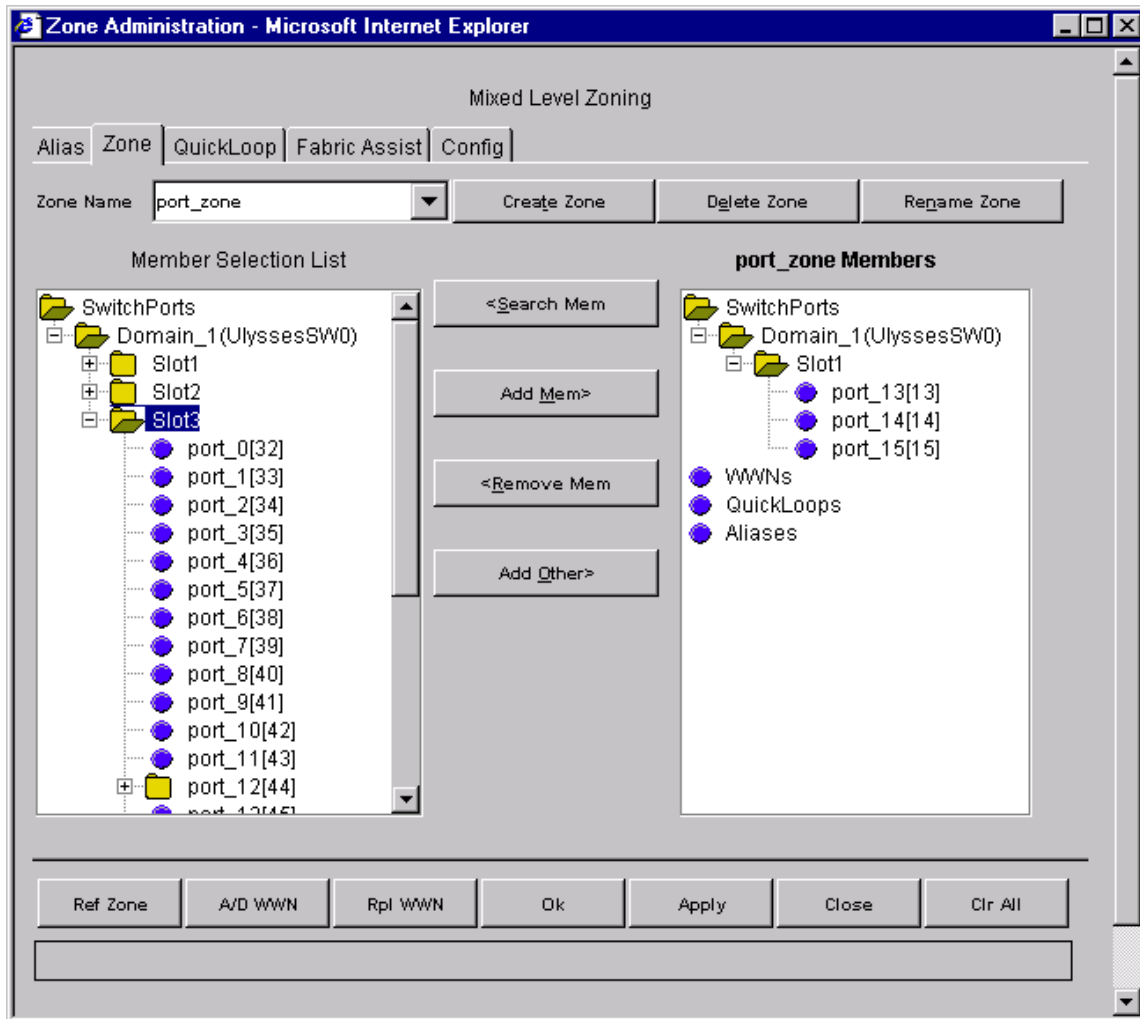
WWN Level Zoning: All zone definitions must be on WWN. Aliases, zones, and configurations that have objects other than WWN cannot be selected or operated on.

AL_PA Zoning: All zoning operations must be on AL_PA in a QuickLoop. Aliases, zones, and configurations that have objects other than AL_PA's in a QL cannot be selected or operated on.

Mixed Level Zoning: Any object can be selected to be a member of the zone, alias, or configuration file.

When using WEB TOOLS for Zoning, the one major change is how a port is selected on the SW12000. To select the appropriate port, it is now necessary to first select the slot on which the port resides.

Notice in the figure that the SW12000 contains slots and ports.



WEB TOOLS Zoning and RSCN's

After configuring all the alias, zone, and configuration objects, it is still necessary to save and activate them.

Using FOS 4.0, 3.x, and 2.6 under the '**Config**' (Port Config) tab, when you click '**Ok**' or "**Apply**" with the "**Enable Config**" radio box checked, the changes will be saved to the 'defined' and become "effective". A Fabric Wide RSCN is sent out to all devices that performed an SCR (State Change Registration).

Zone Administration - Microsoft Internet Explorer

Mixed Level Zoning

Alias | Zone | QuickLoop | Fabric Assist | **Config**

Cfg Name:

Zone/QLoop/FA Zone Selection List

- ☒ Zones
- ☐ QuickLoops
- ☐ FaZones

cfg1 Members

- port_zone
- wwn_zone
- mixed_zone

☒ **Enable Config**

☐ Disable Zoning

☐ Save Config

When you click ‘Ok’ or “Apply” with the “Save Config” radio box checked under the “Config” tab , the changes will be saved to the ‘Defined’ configuration and will not become ‘effective’. No RSCN is sent out to any devices in the Fabric.

The screenshot shows a web-based interface titled "Zone Administration - Microsoft Internet Explorer". The main content area is titled "Mixed Level Zoning" and contains several tabs: "Alias", "Zone", "QuickLoop", "Fabric Assist", and "Config". The "Config" tab is currently selected.

Under the "Config" tab, there is a "Cfg Name" field with a dropdown menu showing "cfg1". To the right of this field are three buttons: "Create Cfg", "Delete Cfg", and "Rename Cfg".

Below the "Cfg Name" field is a "Zone/QLoop/FA Zone Selection List" on the left and a "cfg1 Members" list on the right. The "Zone/QLoop/FA Zone Selection List" contains three items: "Zones" (with a folder icon), "QuickLoops" (with a blue circle icon), and "FaZones" (with a blue circle icon). The "cfg1 Members" list contains three items: "port_zone", "wwn_zone", and "mixed_zone".

Between the two lists are five buttons: "<Search Mem", "Add Mem>", "<Remove Mem", "Analyze Config", and "Refresh Fabric".

At the bottom of the interface, there are three radio buttons: "Enable Config", "Disable Zoning", and "Save Config". The "Save Config" radio button is selected. To the right of these radio buttons is a text field containing "Enabled config: cfg1".

At the very bottom, there is a row of buttons: "Ref Zone", "A/D WWN", "Rpl WWN", "Ok", "Apply", "Close", and "Clr All".

Another point worth mentioning is that if another user changes the zoning while WEB TOOLS Zoning is open, the “**Ref Zone**” button will begin to flash red. This is the same behavior as Web Tools in FOS 3.0.

QuickLoop/Fabric Assist (QLFA)

QuickLoop/Fabric Assist (QLFA) connects private loop hosts to the SAN fabric for better performance and fault management, while protecting investments in legacy loop devices. Because many legacy devices are designed for FC-AL configurations, Fabric OS translative mode protects investments by supporting private loop target devices. The SW12000 running Fabric OS v4.0 currently does not support QuickLoop or Fabric Assist directly. However, it is possible to connect switches that do support QuickLoop or Fabric Assist to a SW12000. It is also possible to connect devices that are accessed by QuickLoop/Fabric Assist devices to the SW12000. This means that any type of 'target' device may be attached to a switch running Fabric OS v4.0 and may be included in a QuickLoop Fabric Assist zone that has its private host attached to a switch running QuickLoop and Zoning. QuickLoop and Zoning are prerequisites for QLFA, on Fabric OS v2.3 or later (SilkWorm 2xxx) or v3.0.1 or later (SilkWorm 3800/3200).

Other Zoning Notables

- LUN Level Zoning is not supported in FOS 4.0 and FOS 3.0, but support is anticipated in FOS 4.1 and FOS 3.1.

- According to the 12K TOI, the Zoning configuration size limit are:

 - FOS 4.x 128KB

 - FOS 3.x 128KB

 - FOS 2.x 96KB

When operating in a mixed 2xxx and 3xxx/SW12000 environment, the switch with smallest configuration size will be the limiting factor. So in a mixed Fabric with SW12000 in the core and 2xxx on the edge, the maximum zoning configuration size will be limited to 96KB.

- There's a new 'root' level command called 'cfgsize' which will report the size of the current zoning configuration. More recent versions of FOS 4.0 including v4.0.0rc5 contain this command.

Sample output follows:

```
UlyssesSW0:root> cfgsize
```

```
Zone DB max size - 131000 bytes
    committed - 332
    transaction - 0
```

```
UlyssesSW0:root> cfgshow
```

```
Defined configuration:
```

```
cfg:  cfg1      port_zone; wwn_zone; mixed_zone
```

```
cfg:  mycfg     myzone
```

```
cfg:  mycfg2    myzone2
```

```
zone: mixed_zone
```

```
      1,15; 20:00:00:20:37:d8:d6:e5; 20:00:00:20:37:d8:d6:8f
```

```
zone: myzone    1,30; 1,31; 1,29
```

```
zone: myzone2   1,29; 1,30; 1,31; 1,28
```

```
zone: port_zone
```

```
      1,13; 1,14; 1,15
```

```
zone: wwn_zone
```

```
      20:00:00:e0:8b:04:03:76; 20:00:00:e0:8b:01:98:62;
```

```
      20:00:00:20:37:d8:d6:e5; 20:00:00:20:37:d8:d6:8f
```

```
Effective configuration:
```

```
cfg:  mycfg2
```

```
zone: myzone2  1,29
```

```
          1,30
```

```
          1,31
```

```
          1,28
```

